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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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Page 2 de l'attestation**

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METHOD AND APPARATUS FOR USE WITH E-MAIL

The invention relates to a method of and apparatus for notifying a subscriber of the receipt of e-mail at a mail centre.

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In prior art e-mail systems, a subscriber at a remote location accesses his e-mail by logging on to the server of his internet service provider (ISP). The ISP has a mail centre which is responsible for sending and retrieving e-mails to and from the internet, and for storing retrieved e-mails. When the subscriber logs on to the ISP, it informs him of whether or not he has e-mail waiting for him at the mail centre; any such e-mail is then downloaded to the subscriber.

A problem in the prior art is that the subscriber can only tell if he has mail by logging on to the ISP. If there is no mail waiting, then this time is wasted.

15

According to a first aspect of the present invention there is provided a method of notifying a subscriber of the receipt of e-mail by a mail centre comprising transmitting a notification message in a broadcast signal.

20 The notification message may be sent without any (direct) user prompt.

By transmitting the notification message in a broadcast signal the subscriber may be informed of the receipt of e-mail by the mail centre, without the need for the subscriber to log on to the mail centre.

25

The notification message may include an identifier of the receiver/decoder to which the notification message is to be sent. This can allow the receiver/decoder to extract only those notification messages which are destined for the subscriber or subscribers which use that receiver/decoder. Preferably, the receiver/decoder compares the identifier with an identifier which is stored at the receiver/decoder. For example, the receiver/decoder may have a smartcard number and the identifier may comprise at least part of the smartcard number. This can provide a convenient way for the notification message to address the relevant receiver/decoder.

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As used herein, the term "smartcard" includes, but not exclusively so, any chip-based card device, or object of similar function and performance, possessing, for example, microprocessor and/or memory storage. Included in this term are devices having alternative physical forms to a card, for example key-shaped devices such as are often
5 used in TV decoder systems.

Preferably the method further comprises storing information relating to e-mail accounts, for example, e-mail addresses, aliases, passwords, user preferences and so forth. The information is preferably stored at the operator, which may be at a central location. This
10 can allow the operator to manage e-mail accounts.

In order to identify the subscriber to which the notification message should be sent, information relating to e-mail accounts is preferably linked to identifiers of receiver/decoders. For example, notification messages may be sent to receiver/decoders
15 having smartcard numbers and the information relating to e-mail accounts may be linked to the smartcard numbers. This can allow the operator to relate information, such as e-mail addresses, to smartcard numbers, so that it is known to which receiver/decoder the notification message should be sent.

20 The broadcast signal may be part of a subscription service and information relating to e-mail accounts may be linked to information relating to the subscription service. This can allow the subscriber's e-mail account to be managed together with the subscription service.

25 The notification message may contain various pieces of information which can be made available to the subscriber, for example for display on a television screen or on the display of a set-top box. For example, the notification message may comprise an identifier of the recipient of the e-mail (since one receiver/decoder may be used for several e-mail accounts), or an identifier of the sender of the e-mail. The notification message may also
30 comprise at least part of the text of the e-mail, for example the title or the subject of the e-mail. It should be noted that the text may be coded for transmission, and decoded by the receiver/decoder.

Preferably, a receiver/decoder generates a signal for displaying at least part of the

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notification message, such as an identifier of the recipient of the e-mail, an identifier of the sender of the e-mail, or part or all of the text of the e-mail. The receiver/decoder may be the subscriber's receiver/decoder and the signal may be for displaying at least part of the message, for example, on a television screen or on the display of the receiver/decoder.

5

The method may further comprise storing preferences selected by the subscriber, for example, concerning whether or not the subscriber wishes to be notified of e-mail, and the number of e-mails that he wishes to be notified of.

10 Preferably, the subscriber is notified of a selected number of e-mails. For example, the subscriber may be notified of each e-mail received by the mail centre, or the subscriber may be notified only of the first e-mail received by the mail centre since the subscriber last accessed the mail centre.

15 The invention has particular application in the broadcast of digital data, into which additional information may be readily inserted, and thus the broadcast signal is preferably a digital data stream, preferably transmitted via a digital transmission system. As used herein, the term "digital transmission system" includes any transmission system for transmitting or broadcasting for example primarily audiovisual or multimedia digital data.

20 Whilst the present invention is particularly applicable to a broadcast digital television system, the invention may also be applicable to a fixed telecommunications network for multimedia internet applications, to a closed circuit television, and so on.

To reduce the amount of data that is transmitted, the digital data stream may be
25 compressed using a digital compression technique, such as MPEG or other known compression techniques. The term MPEG refers to the data transmission standards developed by the International Standards Organisation working group "Motion Pictures Expert Group" and in particular but not exclusively the MPEG-2 standard developed for digital television applications and set out in the documents ISO 13818-1, ISO 13818-2,
30 ISO 13818-3 and ISO 13818-4. In the context of the present patent application, the term includes all variants, modifications or developments of MPEG formats applicable to the field of digital data transmission.

The notification message may be sent using any known technique which allows the

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insertion of a message into the broadcast signal; for example the notification message may be sent as a section of the digital data stream, such as an MPEG section, or by way of an entitlement management message (EMM).

- 5 The method may further comprise providing the subscriber with a receiver/decoder to receive and/or to decode the broadcast signal. It should be noted that two or more subscribers may share the same receiver/decoder. The term "receiver/decoder" used herein may connote a receiver for receiving either encoded or non-encoded signals, for example, television and/or radio signals, which may be broadcast or transmitted by some
- 10 other means. The term may also connote a decoder for decoding received signals. Embodiments of such receiver/decoders may include a decoder integral with the receiver for decoding the received signals, for example, in a "set-top box", such a decoder functioning in combination with a physically separate receiver, or such a decoder including additional functions, such as a web browser, a video recorder, or a television.

15

The invention is particularly suitable for use with a television broadcast system, and thus the broadcast signal may comprise a television signal. As used herein, "television broadcast system" includes for example and satellite, terrestrial, cable and other system.

- 20 Preferably the notification message is pushed to the subscriber, by which it is preferably meant that the subscriber takes no specific action to enquire about whether e-mail is waiting.

- 25 According to a second aspect of the present invention there is provided a method of notifying a subscriber of the receipt of e-mail by a mail centre, which e-mail is to be transmitted to the subscriber via a first medium, comprising transmitting a notification message, indicating the receipt of e-mail by the mail centre, to the subscriber via a second medium, different from the first medium.

- 30 Preferably the first medium is a switched medium and the second medium is a broadcast medium.

The second aspect may further comprise any of the features of the first aspect and *vice versa*.

- 5 -

In an apparatus embodiment of the present invention there is provided apparatus for notifying a subscriber of the receipt of e-mail comprising means for transmitting a notification message together with a broadcast signal.

- 5 The notification message may include an identifier of a receiver/decoder to which the notification message is to be sent.

- The apparatus may further comprise means for storing information relating to e-mail accounts. Information relating to e-mail accounts may be linked to identifiers of receiver/decoders. The information relating to e-mail accounts may be linked to the smartcard numbers of decoders. The broadcast signal may be part of a subscription service and information relating to e-mail accounts may be linked to information relating to the subscription service.
- 10

- 15 The notification message may comprise an identifier of the recipient of the e-mail. The notification message may comprise an identifier of the sender of the e-mail. The notification message may comprise at least part of the text of the e-mail.

- The apparatus may further comprise means for storing preferences selected by the subscriber.
- 20

- The apparatus may be adapted to notify the subscriber of a selected number of e-mails. The apparatus may be adapted to notify a subscriber of each e-mail received by the mail centre. The apparatus may adapted to notify a subscriber only of the first e-mail received by the mail centre since the subscriber last accessed the mail centre.
- 25

The broadcast signal may be a digital data stream. The apparatus may further comprise means for compressing the digital data stream using a digital compression technique.

- 30 The apparatus may be adapted to send the notification message as a section of the digital data stream. The apparatus may be adapted to send the notification message by way of an entitlement management message.

The broadcast signal may comprise a television signal.

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The apparatus may be adapted to push the notification message to the subscriber.

According to another apparatus aspect, there is provided apparatus for notifying a subscriber of the receipt of e-mail by a mail centre, which e-mail is to be transmitted to the subscriber via a first medium, comprising means for transmitting a notification message, indicating the receipt of e-mail by the mail centre, to the subscriber via a second medium, different from the first medium.

The first medium may be a switched medium and the second medium may be a broadcast medium.

According to another apparatus aspect, there is provided a receiver/decoder for receiving and/or decoding a broadcast signal, comprising means for receiving, together with a broadcast signal, a notification message for notifying a subscriber of the receipt of e-mail by a mail centre.

The receiver/decoder may be adapted to compare an identifier in the notification message with an identifier which is stored at the receiver/decoder. The receiver/decoder may have a smartcard number and the identifier may comprise at least part of the smartcard number.

The receiver/decoder may generate a signal indicating the receipt of e-mail by the mail centre. The receiver/decoder may generate a signal for displaying at least part of the notification message.

According to another apparatus aspect there is provided a receiver/decoder for receiving and/or decoding a broadcast signal, comprising means for receiving e-mail via a first medium and means for receiving a notification message, indicating the receipt of e-mail by the mail centre, via a second medium different from the first medium.

The first medium may be a switched medium and the second medium may be a broadcast medium.

There may be provided a system for notifying a subscriber of the receipt of e-mail comprising apparatus as described above and a receiver/decoder as described above.

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The invention also provides an internet account management system for use with a broadcast system.

- 5 Method features may be applied to the apparatus aspects and *vice versa*. Features of one aspect may be applied to other aspects.

Preferred features of the present invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:-

10

Figure 1 shows the architecture of a typical digital television system;

Figure 2 is a schematic diagram of a receiver/decoder;

Figure 3 shows an overview of an internet access system;

Figure 4 illustrates software layers in the user equipment of Figure 3;

15

Figure 5 shows the architecture of an internet access system;

Figure 6 shows the main components of an internet account management system; and

Figure 7 shows the structure of an entitlement management message.

- 20 An overview of a digital television system 1 is shown in Figure 1. The invention includes a mostly conventional digital television system 2 that uses the known MPEG-2 compression system to transmit compressed digital signals. In more detail, MPEG-2 compressor 3 in a broadcast centre receives a digital signal stream (typically a stream of video signals). The compressor 3 is connected to a multiplexer and scrambler 4 by
25 linkage 5.

The multiplexer 4 receives a plurality of further input signals, assembles the transport stream and transmits compressed digital signals to a transmitter 6 of the broadcast centre via linkage 7, which can of course take a wide variety of forms including
30 telecommunications links. The transmitter 6 transmits electromagnetic signals via uplink 8 towards a satellite transponder 9, where they are electronically processed and broadcast via notional downlink 10 to earth receiver 12, conventionally in the form of a dish owned or rented by the end user. Other transport channels for transmission of

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the data are of course possible, such as terrestrial broadcast, cable transmission, combined satellite/cable links, telephone networks etc.

The signals received by receiver 12 are transmitted to an integrated receiver/decoder
5 13 owned or rented by the end user and connected to the end user's television set 14.
The receiver/decoder 13 decodes the compressed MPEG-2 signal into a television
signal for the television set 14. Although a separate receiver/decoder is shown in
Figure 1, the receiver/decoder may also be part of an integrated digital television. As
used herein, the term "receiver/decoder" includes a separate receiver/decoder, such as
10 a set-top box, and a television having a receiver/decoder integrated therewith.

In a multichannel system, the multiplexer 4 handles audio and video information
received from a number of parallel sources and interacts with the transmitter 6 to
broadcast the information along a corresponding number of channels. In addition to
15 audiovisual information, messages or applications or any other sort of digital data may
be introduced in some or all of these channels interlaced with the transmitted digital
audio and video information.

A conditional access system 15 is connected to the multiplexer 4 and the
20 receiver/decoder 13, and is located partly in the broadcast centre and partly in the
receiver/decoder. It enables the end user to access digital television broadcasts from
one or more broadcast suppliers. A smartcard, capable of deciphering messages
relating to commercial offers (that is, one or several television programmes sold by the
broadcast supplier), can be inserted into the receiver/decoder 13. Using the
25 receiver/decoder 13 and smartcard, the end user may purchase commercial offers in
either a subscription mode or a pay-per-view mode.

As mentioned above, programmes transmitted by the system are scrambled at the
multiplexer 4, the conditions and encryption keys applied to a given transmission being
30 determined by the access control system 15. Transmission of scrambled data in this
way is well known in the field of pay TV systems. Typically, scrambled data is
transmitted together with a control word for descrambling of the data, the control word
itself being encrypted by a so-called exploitation key and transmitted in encrypted

form.

The scrambled data and encrypted control word are then received by the receiver/decoder 13 having access to an equivalent to the exploitation key stored on a smart card inserted in the receiver/decoder to decrypt the encrypted control word and thereafter descramble the transmitted data. A paid-up subscriber will receive, for example, in a broadcast monthly ECM (Entitlement Control Message) the exploitation key necessary to decrypt the encrypted control word so as to permit viewing of the transmission.

10 An interactive system 16, also connected to the multiplexer 4 and the receiver/decoder 13 and again located partly in the broadcast centre and partly in the receiver/decoder, enables the end user to interact with various applications via a modemed back channel 17. The modemed back channel may also be used for communications used in the conditional access system 15.

Physical interfaces of the receiver/decoder 13 are used for downloading data. With reference to Figure 2, the receiver/decoder 13 contains, for example, six downloading devices; MPEG flow tuner 4028, serial interface 4030, parallel interface 4032, modem 4034 and two card readers 4036.

The broadcast and reception system is also used to provide internet services such as web browsing and e-mail. An application which is run by the receiver/decoder 13 enables the receiver/decoder to access internet services and to display web pages and e-mails either on television set 14 or via a computer connected to the receiver/decoder 13.

Referring to Figure 3, an overview of the internet access system will be described. User equipment 20 (which includes a receiver/decoder) communicates with operator 22 via the public switched telephone network (PSTN) 24. The user equipment sends a request to the operator 22 to be sent certain data, for example, a particular web page or e-mail. The operator receives this request and outputs the request to internet service provider (ISP) 26. In response to this request, the ISP supplies a response to the operator, which might comprise a requested web page obtained from the internet 27,

- 10 -

or an e-mail which was waiting for the subscriber at the ISP. The operator delivers the response to the broadcast centre 28, where it is integrated into a private section of the MPEG bitstream and transmitted by the transmitter 6 and received by receiver 12 as previously described. The user equipment 20 extracts the response from the MPEG bitstream and displays it on a television set or on a computer screen. The response may alternatively be transmitted to user equipment 20 via the PSTN 24.

As shown in figure 4, the software levels employed in the user equipment 20 comprise a web browser application, such as Netscape or Microsoft Internet Explorer, an e-mail application such as Microsoft Outlook Express, HTTP, socket, TCP/IP, PPP/SLIP and a driver level. The driver level is modified, as compared with a browser application running traditionally on a PC, in that it is divided into a modem driver for communicating with the PSTN 24 via the modem of the user equipment and a tuner driver for communicating via the MPEG flow tuner 4028.

Various configurations of the user equipment 20 are possible. In one configuration a PC is not used and all of the user software runs on the receiver/decoder 13. In this configuration the receiver/decoder 13 communicates with the PSTN 24 either via an internal modem or via an external modem and the serial port. The receiver/decoder 13 can receive Internet responses in the bitstream from the earth receiver 12. In this configuration, the user interface is provided by a remote controller and a television set connected to the receiver/decoder 13.

In another configuration a personal computer (PC) is provided which is connected by its parallel port to the parallel port 4032 of the receiver/decoder 13 (or optionally by its serial port to the serial port 4030 of the receiver/decoder 13). In this case, an upper portion of the software levels shown in Figure 4 run on the PC, and the remaining lower portion of the software levels run on the receiver/decoder 13. The user interface is provided by a keyboard and a monitor connected to the PC.

In a further configuration a PC is connected to the PSTN 24 via an internal or external modem of the PC. In this configuration, the receiver/decoder 13 may be provided separately or in the form of an add-on or plug-in card of the PC, connected to the ISA

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or PCI bus thereof.

The architecture of the internet access system is shown in Figure 5. Referring to Figure 5, internet account management system (IAMS) 50 is linked to internet service provider (ISP) 26 which provides services such as web browsing and e-mail. The IAMS 50 is also linked to subscriber management system (SMS) 60 which manages subscribers and sends requests to the IAMS to grant or deny access to internet services. The main functions of the IAMS are as follows:

- 10 ○ maintaining a centralised list of e-mail account parameters linked to subscriber parameters such as smartcard number
- granting or denying access to internet services for a subscriber at the request of the SMS
- customising internet accounts at the request of subscribers (provisioning)
- 15 ○ reminder service, which allows an e-mail user to register an event and to be warned by an e-mail at the time of the event
- replication service, which allows updates of the IAMS contents to be copied to a related server, such as an ISP
- 20 Receiver/decoder 13 runs an e-mail application that allows a registered e-mail user to send and receive e-mail and to access the IAMS for provisioning and reminder services. Receiver/decoder 13 is connected to the IAMS via an internal modem, the public switched telephone network (PSTN) 24, network access server (NAS) 56, and gateway 58. Receiver/decoder 13 also accesses the ISP 26 via gateway 58, although where
- 25 receiver/decoder 13 is equipped with the necessary protocols, it may communicate directly with the ISP via the PSTN, as is indicated by dashed line 57.

Gateway 58 allows subscribers to access internet services in real time. Such services include mail services for sending and receiving mail and other services which may be provided by ISP 26, and provisioning services and reminder services, which are provided by the IAMS. The gateway 58 is a message router that enables simultaneous communication in a single modem connection. In respect of IAMS features, the gateway is responsible for redirecting the requests to the provisioning server (for e-mail account management) and to the reminder server (to manage reminder events).

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ISP interface 66 allows each modification related to a user's account which takes place in the IAMS to be duplicated to a user account in ISP 26 in charge of hosting internet services, such as mail services. It should be noted that all information relating to subscriber accounts is centralised in the IAMS, which ensures the management of TV and internet parameters.

Subscriber management system (SMS) 60 manages subscribers and sends requests to the IAMS in order to grant or to deny access to internet services by subscribers.

- 10 In order to set up a e-mail account, a subscriber first sends a request for a new account, together with the selected options, from the receiver/decoder 13 to the IAMS 50. The IAMS checks the smartcard number of the subscriber against a list of smartcard numbers, obtained from subscriber management system (SMS) 60, corresponding to subscribers for which it may set up e-mail and internet accounts. The IAMS then sends a request to the
- 15 ISP to set up an e-mail account. Once the account has been set up, the ISP returns an acknowledgement to the IAMS, together with the e-mail address and password for the e-mail account. This information is stored in the IAMS, along with the smartcard number of the subscriber. The IAMS informs the subscriber that his account has been set up. The subscriber can then send and receive mail to and from the mail server 28 via gateway 18
- 20 using the e-mail password. Alternatively, if the receiver/decoder is equipped with the necessary protocols, it may access the mail server directly via the PSTN, rather than via the gateway.

- Two types of account may be distinguished for accessing internet services from a receiver/decoder or a PC: a "connection account" and a "directory account". A connection account allows a subscriber to access the operator network. A subscriber is provided with a single connection account per operator, possibly associated with several connection profiles. Authentication takes place at network level. A directory account allows access to internet services (Proxy with authentication, mail, news). A subscriber's
- 30 directory accounts are linked to his connection account. Authentication takes place at application level.

With reference to a connection account, a "connection profile" allows a subscriber to connect to the operator network. Examples of different profiles that a subscriber may

- 13 -

have are:

- profiles for connection from a computer (using, for example, MediaWebPC supplied by Canal+), with a return by modem and by satellite or cable
- 5 - profiles for connection from a receiver/decoder

A "login" and password are used for authentication of a subscriber when he logs on to the operator network. The protocols used may be, for example, PAP or CHAP of PPP for dial-up modems a "login"/password sequence for access via Raw-TCP mode, or
10 protocols to be determined for access via a cable network.

The connection profiles are used by the authentication server(s) of the operator (in general RADIUS servers). Each "login" has to be unique. The uniqueness is assured through the use of the "MSD" number, as explained below.
15

The directory account allows the access to the internet services to be controlled from the computer. A directory account consist of:

- an identifier and a password
- 20 - one or more e-mail aliases
- other data relating to services offered to subscribers

The identifier is used to enable a subscriber to gain access to his mailbox, and for the management of the access by the subscribers to certain ISP services (private websites, directories, control of access to services, certificates, registration in "mailgroups" etc.).
25

The identifier is also used to receive emails addressed to "identifier@domain". The password is used when the subscriber accesses his mailbox identified by the identifier.

30 The e-mail aliases are used by the email server to receive e-mails addressed to "alias@domain".

The subscriber identifier is also used to control access to web pages with access restrictions, Proxy with authentication servers, News servers etc.

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It is possible to associate several directory accounts with one single connection account (family subscription). The number of directory accounts which is allowed per connection account can be specified. The number of screen names associated with a directory account is limited. Each identifier and each screen name has to be unique.

5

Each subscriber connection profile consist of a login and a password.

The login field of a connection profile consists, as of the MSD number of the subscriber, of the type of terminal used (PC or TV), of the type of return selected (satellite or
10 modem), of the client version and, if applicable, of the RADIUS domain name of the client:

{MSD_number}{terminal_type}{return_type}{version}[@RADIUS_domain_name]},

15 with the fields in square brackets being optional.

The "MSD_number" field consists of the following string of fields:

20 * RSMC (Removable Security Module Product Code). This code identifies the type of SmartCard and the commercial operator who owns the card. This field is 2 bytes long, and a maximum of four digits.

* RSMN (Removable Security Module Number). This code identifies the SmartCard of the subscriber in a unique manner. This field is 4 bytes long, and a maximum of nine digits.

25 * Check digit. The check digit is computed based on the two preceding fields and enables verification of the validity of the MSD number. This field is 2 digits long.

In this entire specification, and in the absence of any indication to the contrary the MSD number is always considered with its check digit, hence of 15 digits maximum.

30

The "terminal_type" field takes the value "P" for a PC type terminal and the value "T" for a TV type terminal. The "return_type" field takes the value "M" for a pure modem return and the value "S" for a mixed satellite and modem return. The "version" field consists of two numeric characters, which are set to 01 by default.

- 15 -

The domain name RADIUS is managed by the network operator. This field allows a client's authentication request to be directed to the correct authentication server, in the case of the provision by a third party of gateways to different service providers. The field may contain alphanumeric characters, and its length is variable with a maximum of sixteen
5 characters. In view of compatibility with current versions, the default value for this field is null.

The password field consists of letters and numbers with a maximum length of 14 characters. The passwords are identical for all connection profiles of a subscriber
10 (imposed by the connection kit and the CGA/IPS dialogue).

The main components of the IAMS are shown in Figure 6. Central to the IAMS is a relational database management system (RDBMS) 70, which contains subscription information for internet services and e-mail accounts, stored in storage means 72. SMS
15 communication interface 74 allows the IAMS to communicate with the SMS, so that the IAMS may be updated with the details of subscribers who have been granted or denied access to mail services. Provisioning server 76 allows a subscriber to manage and customise his e-mail account, for instance, by selecting various options, as will be described. Reminder server 78 allows a subscriber to manage a list of events. An event
20 is related to a subscriber's e-mail account. A subscriber may register an event and receive an automatic reminder a predetermined number of days before the event via an automatically generated e-mail. E-mail notification interface 84 allows the EMNS 62 to search for a subscriber's notification preferences in the IAMS RDBMS 70 in order to send an over air notification message. Support server 80 allows an administrator to check the
25 presence and the status of a subscriber or an e-mail user in the IAMS. Replication service 82 copies updates of the contents of the IAMS RDBMS 70 to the ISP account management system.

The various components of the IAMS will now be described in more detail.
30

The IAMS RDBMS

The IAMS RDBMS contains subscription information for Internet Service and Mail accounts parameters. The IAMS RDBMS contains three types of parameters:

- 16 -

- Global parameters: These parameters apply to the whole IAMS system.
 - Subscriber parameters: These parameters are related to the subscriber's accounts.
 - User parameters: These parameters are related to the user's accounts
- 5 (Mail parameters)

Global parameters:

- Domain name for Mail address,
- Maximum number of Mailboxes per TV account,
- 10 - Maximum number of aliases per E-mail address,
- Maximum number of events (Reminder services) per Email address
- Black list of Email addresses

For each subscriber:

- 15 - SmartCard number,
- Password (optional)
- Status of the subscriber (Suspended, Activated)
- Last operation type on the subscriber account

20 For each Mail account:

- Link to the related subscriber's SmartCard number,
- Email identifier (EmailID@operator_domain_name)
- Mailbox password,
- Notification preferences (never being notified, notification at each mail
- 25 received, notification at first new mail)
- User first and last name (as defined by the user via the provisioning server),
- Related list of Reminder events (optional)
- Forward address (optional)
- 30 - Email aliases (optional)
- Status of the Mail account (activated, suspended)
- Replication status
- Last operation type on the Mail account

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Interface with SMS

Interface with the SMS allows the IAMS to be updated with subscribers having access to Internet services. SMS requests handled by the IAMS are:

5

- Subscription creation, cancellation
- Subscription modification (add the commercial offer or change password, the latest being optional)
- Subscription suspension, reactivation
- 10 - SmartCard Exchange

When a subscription is Suspended/Reactivated, all the Mail accounts depending on the related subscriber are Suspended/Reactivated. By cancelling the subscription for a subscriber, all the related Mail accounts are deleted.

15

Provisioning Server

This interface allows a subscriber to manage his Email accounts himself for standard actions. Account registration consists of registering the accounts on a centralised database system (the IAMS RDBMS) and replicate them to the Mail servers. Standard

20

actions are:

- Create, modify or delete an e-mail account,
- List the existing Mail accounts related to a subscriber (based on his SmartCard number).

25

The maximum number of e-mail accounts that a subscriber can create is configured as a global parameter.

30

The subscription process is done online in order to acknowledge the request to the subscriber in real time. To preserve independence between the IAMS system and the ISP account management system, once the request is acknowledged with the subscriber, the request is then sent automatically to the ISP interface, but in asynchronous mode (see Replication Service).

- 18 -

The IAMS stores the status of the replication towards the ISP account management system (In progress, Done, Error etc.).

5 Whilst the status of the replication on the IAMS RDBMS is not recorded as "Done", the corresponding Mail account can not be updated.

User ID "Black List"

10 The IAMS manages a user ID "black list" which includes all forbidden user IDs. Once a user ID is added to the User ID black list, the IAMS will ensure that no user will be delivered the related e-mail address.

Quarantine period

15 In order to prevent an e-mail address to be immediately re-allocated to a alternate user once deleted (and then allowing mails to be delivered to wrong recipient), any deleted email address is kept in quarantine before being available for a further user allocation by the provisioning server.

The quarantine period automatically expires after a pre-defined delay.

20 Reminder Server

Information about events is stored in the IAMS RDBMS and linked to a user Email account.

25 The reminder service allows a subscriber to register an event and receive an automatic reminder 1 to 15 days before the date of the event via an automatically generally Email. Standard actions are:

- Create, modify or delete an event,
- List the existing user events related to a Mail account.

30

An event contains the date of the event, the date of the warning (from 1 to 15 days before the event), an event type (birthday, wedding) and a free text.

- 19 -

The maximum number of events that a subscriber is able to create is configured as a global parameter.

5 A subscriber accesses the reminder service through the Email application on the set-top box, to create, delete event. Up date is done in real time on the IAMS.

The Reminder Server is also in charge of scanning the IAMS RDBMS every day to select the events to be announced. For each event to announce, it composes a new email and sends it to the corresponding Mail address.

10

Email Notifier Communication Interface

The Email Notifier System allows subscribers to be notified as soon as they receive a new e-mail in their mailboxes. A short message is sent to their set-top box over-air.

15 Once the EMNS has received a notification request from the ISP, it searches in the IAMS RDBMS for the subscriber's notification preference (on or off) and related parameters needed to compose a notification message. The notification message is then sent to the broadcasting system, in order to be delivered to the subscriber.

20 Republication Service

The replication service is based on a Message Queue System (MQS, a message management system). It receives requests from the IAMS RDBMS, and relays them to the ISP account management system. Request are forwarded in real time, but in an asynchronous manner.

25

All mailbox creation, modification or deletion commands are then replicated to the ISP interface.

30 The IAMS RDBMS stores the status of the replication of each request towards the ISP account management. The IAMS RDBMS expects an acknowledgement of each request processed by the ISP account management system (Done or Error). The acknowledgements exchanged between the ISP and the IAMS RDBMS are managed by the MQS.

- 20 -

The main interests of the MQS are:

- A unique interface between the RDBMS and the ISP account management system,
- 5 - Asynchronous Reliable service: Each message exchange is secured. The asynchronous mode allows both system (IAMS and ISP account management system) to be independent.

The network protocol used is TCP/IP.

10

Support Server

The IAMS is provided with a Support Server which help operators with Customer Care. The Support server provides the following features:

- 15 - List Mail accounts for a given subscriber (identified either by his SmartCard number or one of his Email addresses),
- Check the status of a subscriber account (Activated, Suspended),
- Check the replication status of a Mail account (Done, In Progress, Error etc.)
- 20 - Check the matching of a Mail account password
- Check the notification preferences for a Mail account
- List Reminder Events for a mail account
- Check the last operation type on an account, as well as the date of the last operation.

25

Administrative Tools

The IAMS is provided with the administrative tools which help IAMS administrators with the following tasks:

- 30 - Remove an single entry from the quarantine list
- Re send a replication command to the ISP

Administration

- 21 -

The IAMS is a multi-faceted system implemented through various processes.

The IAMS database contains the operator data which is required for the correct operation of the system. All the tools require to management these data properly are
5 part of the IAMS furniture.

Administration functions

The role of the administration tools is to exploit the IAMS system by:

- 10 - Launching each process
- Stopping the processes
- Monitoring the processes,
- Setting or retrieving internal parameters of the processes.

15 IAMS High Availability

The IAMS High availability System is a specialised facility for protecting mission-critical applications from a wide variety of hardware and software failures.

It monitors the health of each node and responds to failures in a way that minimises
20 application downtime. It is able to detect and respond to failures in the following components:

- System processors
- System memory
- 25 - LAN media and adapters
- System processes
- Application processes

With this system, application services and all the resources needed to support the
30 application are bundled into special entities called application packages. These application packages are the basic units that are managed and moved within a cluster.

The High Availability System is configured into active-active recovery strategy. In an

- 22 -

active-active configuration, every node runs at least one application package and provides backup services for one or more other packages running on other nodes.

Two application packages are defined:

5

- The IAMS (IAMS RDBMS and Replication Service)
- The subscribers services (Provisioning Server, Reminder Server, Email Notifier)

10 Repartition of services into packages may differ depending on the sizing of the system. Each application is accessed by a virtual IP address which belongs to the package. When a package moves towards the other system, the second system mounts the related disks and activate this virtual IP address.

15 Implementation

- RDBMS
 - Sybase Adaptive Server 11.9.2
- HARDWARE
 - HP/UNIX server
- 20 - OC
 - HP-UX 11.0 Software
- High availability software
 - HP Multi-Computer/Service Guard
- Netscape Web Server

25

E-mail notification

As shown in Figures 5 and 6, the IAMS is provided with an e-mail notification interface 84, which interfaces with e-mail notification system (block 62 in Figure 5). The e-mail
30 notification system allows subscribers to be notified as soon as they receive new e-mail in their mail boxes in mail server 64.

The mail server 64 stores e-mails which have been received from the internet and which

- 23 -

are destined for the subscriber. When new mail is received the mail server sends a notification demand to e-mail notification system (EMNS) 62. The notification demand is only sent on receipt of new mail by the ISP 26, that is, it is event driven. The various messages that may be sent from the ISP to the EMNS are as follows:

5

- new e-mail - new e-mail is waiting
- first e-mail - first e-mail since subscriber last connected
- subscriber connected to mail server

- 10 Once the EMNS has received a notification request from the ISP, it searches in the IAMS RDBMS 70 for the subscriber's notification preferences and related parameters needed to compose a notification message. Various preferences which may be selected by the subscriber include the following:

- 15
- e-mail notification on or off
 - notify each new mail or first mail since last connection to the ISP
 - display the sender of the e-mail
 - display the recipient of the e-mail

- 20 The EMNS also checks that the subscriber has not been denied use of the notification system, for example by the SMS. If the above checks reveal that the subscriber should be informed of his e-mail, then a notification message is then generated for relay to the subscriber. The notification message contains the smartcard number of the receiver/decoder of the subscriber concerned, which is extracted from the IAMS RDBMS

- 25 70. The smartcard number uniquely identifies the receiver/decoder (although it is not necessarily unique to a subscriber, since a receiver/decoder may serve a plurality of subscribers). The notification message may also contain other information such as information identifying the recipient of the e-mail, information identifying the sender of the e-mail, and text for display by the receiver/decoder, such as the title or subject of the
- 30 e-mail.

A request to broadcast the notification message is sent from the EMNS to broadcast centre 63. On receipt of the request, the broadcast centre transmits the notification message at regular intervals for a predetermined amount of time, for example, every 15

- 24 -

minutes for 24 hours. The cycle time may be varied; for example the notification message may be sent relatively frequently for a first period of time and relatively infrequently for a second period of time. The notification message may be sent, for example, as an entitlement management message (EMM) or as an MPEG-2 section.

5

Referring to Figure 7, the structure of an EMM suitable for sending an e-mail notification message is now described. The EMM, which is implemented as a series of digital data bits, comprises a header 3060, the EMM proper 3062, and a signature 3064.

10 The header 3060 comprises a type identifier 3066, which in this case identifies the EMM as an individual type (that is, destined for a single subscriber), a length identifier 3068, which gives the length of the EMM, an address 3070, which is based on the smartcard number of the subscriber, an operator identifier 3072 and a key identifier 3074.

15 The EMM proper 3062 comprises information identifying the EMM as a mail notification EMM together with other information relating to the mail notification. For example, the EMM may contain information concerning the recipient of the e-mail in the household (where there are several e-mail subscribers each using the same receiver/decoder), the sender of the e-mail, the title or subject of the e-mail, the number of waiting e-mails, and
20 so on. Also in this part of the EMM is an index which identifies that particular EMM.

Finally, the signature 3064, which is typically of 8 bytes long, provides a number of checks against corruption of the remaining data in the EMM.

25 As mentioned above, instead of using an EMM to transmit the notification message, an MPEG section could also be used, in which any or all of the above information could be included. The advantage of using an MPEG section is that, unlike an EMM, the cycle time is not fixed, so that the notification message may be sent at varying intervals.

30 Each receiver/decoder monitors incoming notification messages and extracts those containing the smartcard number of that receiver/decoder. If more than one subscriber is connected to the receiver/decoder, it identifies the particular subscriber to whom the e-mail is addressed, based on information in the notification message. The receiver/decoder then informs the subscriber that e-mail is waiting for him, for example by displaying a

- 25 -

message on the receiver/decoder display, or on the television screen. Other information contained in the notification message may also be displayed.

- Finally, when the receiver/decoder has received a mail notification message, it "burns" the message, so that the message is not repeatedly displayed. This is done by comparing incoming mail notification messages to ones that have already been received, and only notifying new messages. Typically, the EMM or MPEG section contains an index identifying that EMM or MPEG section, in which case only the indexes need be compared in order to identify whether that message has already been received and acted upon.
- 10 Additionally or alternatively, the receiver/decoder 13 could request the EMNS 62 to stop sending the notification message, for example by sending a request via the PSTN 24.

- Once the subscriber has been notified of waiting mail, he can send a request to the ISP to send the e-mail. The e-mail may be sent either via the PSTN 24, or via communications link 8,9,10, in the way described above with reference to Figure 3. In an alternative embodiment, on receipt of an e-mail notification message, the receiver/decoder 13 automatically downloads the e-mail and stores it locally for access later by the subscriber.
- 15

- It will be appreciated that the e-mail notification system described above notifies a subscriber of the arrival of e-mail at a mail centre without the subscriber having to enquire whether e-mail is waiting, that is, the mail notification message is "pushed" to the subscriber.
- 20

- It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.
- 25

Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination.

- 30 Reference numerals appearing in the claims are by way of illustration only and shall have no limiting effect on the scope of the claims.

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Glossary

The acronyms and terms in this glossary are defined with respect to the CANAL + Internet Account Management System.

5 ACRONYMS

	EMN	Email notifier
	IAMS	Internet Account Management System
	IMAP	Internet Message Access Protocol
	ISP	Internet Service Provider
10	NAS	Network Access Server
	MQS	Message Queue Server
	PSTN	Public Switched Telephone Network
	RDBMS	Relational Database Management System
	SMS	Subscriber Management System
15	STB	Set Top Box
	TCP/IP	Transmission Control Protocol/Internet Protocol

TERMS

20	Email Address	An Email address is composed of two fields: the Email ID and the domain name. The form of an Email Address is Email_Id@Domain_Name.
	Email Account	An Email Account provides information about the user that a Mail Server needs to process that user's messages.
25	Email Id	The prefix of an email address. An Email Id is unique in a domain name.
	Email Notifier	The Email Notifier System allows subscribers (EMN) to be notified as soon as they receive a new email in their mailboxes. A short message is sent to their STB over-air.
30	Internet Account	A system managing subscriber TV account Management parameters and related Email Accounts System (IAMS) parameters
	Mailbox	Messages stored for IMAP delivery are held in a mailbox. A mailbox on a mail server must be uniquely identified by a

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- mailbox Id. A mail server hosting different domain name can not consider that the Email Id is unique on the Mail server, so the mailbox Id must be the Email address.
- 5 Mail Program that exchanges email with other Mail Servers and accepts and delivers messages to mail clients.
- Message Queue Server
- (MQS) Provisioning Allows a subscriber to create and customise Server his email accounts itself.
- Reminder
- 10 Server Set Allows a user to register an event and receive an automatic reminder via an automatic mail.
- Set Top Box The completely assembled, ready to use (STB) digital decoding hardware, manufactured in accordance with Digital Video Broadcasting standards, CANAL + TECHNOLOGIES specifications. It is used as a digital decoder for transmitted video, audio, application and data streams so that the end user can access television programs and services.
- 15
- SmartCard Cards that electronically store the secret keys of one or more commercial operators and other access information.
- 20 Subscriber A subscriber is related to a TV account (i.e.a SmartCard number).
- Subscriber Management
- System (SMS) A system managing data relating to subscribers.
- User A user is related to an email account. There may be multiple
- 25 users for a single subscriber.

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CLAIMS

1. A method of notifying a subscriber of the receipt of an e-mail by a mail centre, comprising transmitting a notification message in a broadcast signal.
5
2. A method according to claim 1 wherein the notification message includes an identifier of a receiver/decoder to which the notification message is to be sent.
3. A method according to claim 2 wherein the receiver/decoder compares the
10 identifier with an identifier which is stored at the receiver/decoder.
4. A method according to claim 2 or 3 wherein the receiver/decoder has a smartcard number and the identifier comprises at least part of the smartcard number.
- 15 5. A method according to any of the preceding claims further comprising storing information relating to e-mail accounts.
6. A method according to claim 5 wherein information relating to e-mail accounts is linked to identifiers of receiver/decoders.
20
7. A method according to claim 6 wherein notification messages are sent to receiver/decoders having smartcard numbers and the information relating to e-mail accounts is linked to the smartcard numbers.
- 25 8. A method according to any of claims 5 to 7 wherein the broadcast signal is part of a subscription service and information relating to e-mail accounts is linked to information relating to the subscription service.
9. A method according to any of the preceding claims wherein the notification
30 message comprises an identifier of the recipient of the e-mail.
10. A method according to any of the preceding claims wherein the notification message comprises an identifier of the sender of the e-mail.

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11. A method according to any of the preceding claims wherein the notification message comprises at least part of the text of the e-mail.

12. A method according to any of the preceding claims wherein a receiver/decoder generates a signal for displaying at least part of the notification message, and preferably for displaying an identifier of the recipient and/or sender of the e-mail.

13. A method according to any of the preceding claims further comprising storing preferences selected by the subscriber.

10

14. A method according to any of the preceding claims wherein the subscriber is notified of a selected number of e-mails.

15. A method according to any of the preceding claims wherein a subscriber is notified of each e-mail received by the mail centre.

20

16. A method according to any of claims 1 to 14 wherein the subscriber is notified only of the first e-mail received by the mail centre since the subscriber last accessed the mail centre.

17. A method according to any of the preceding claims wherein the broadcast signal is a digital data stream.

18. A method according to claim 17 wherein the digital data stream is compressed using a digital compression technique.

19. A method according to claim 17 or 18 wherein the notification message is sent as a section of the digital data stream.

20. A method according to claim 17 or 18 wherein the notification message is sent by way of an entitlement management message.

21. A method according to any of the preceding claims including providing the subscriber with a receiver/decoder to receive and/or to decode the broadcast signal.

- 30 -

22. A method according to any of the preceding claims wherein the broadcast signal comprises a television signal.

23. A method according to any of the preceding claims wherein the notification
5 message is pushed to the subscriber.

24. A method of notifying a subscriber of the receipt of e-mail by a mail centre, which e-mail is to be transmitted to the subscriber via a first medium, comprising transmitting a notification message, indicating the receipt of e-mail by the mail centre, to
10 the subscriber via a second medium, different from the first medium.

25. A method according to claim 24 wherein the first medium is a switched medium and the second medium is a broadcast medium.

15 26. Apparatus for notifying a subscriber of the receipt of e-mail by a mail centre, comprising means for transmitting a notification message together with a broadcast signal.

27. Apparatus according to claim 26 wherein the notification message includes
20 an identifier of a receiver/decoder to which the notification message is to be sent.

28. Apparatus according to claims 26 or 27 further comprising means for storing information relating to e-mail accounts.

25 29. Apparatus according to claim 28 wherein information relating to e-mail accounts is linked to identifiers of receiver/decoders.

30 30. Apparatus according to claim 29 wherein the information relating to e-mail accounts is linked to the smartcard numbers of decoders.

32. Apparatus according to any of claims 28 to 30 wherein the broadcast signal is part of a subscription service and information relating to e-mail accounts is linked to information relating to the subscription service.

- 31 -

33. Apparatus according to any of claims 26 to 32 wherein the notification message comprises an identifier of the recipient of the e-mail.

34. Apparatus according to any of claims 26 to 33 wherein the notification message comprises an identifier of the sender of the e-mail.

35. Apparatus according to any of claims 26 to 34 wherein the notification message comprises at least part of the text of the e-mail.

36. Apparatus according to any of claims 26 to 35 further comprising means for storing preferences selected by the subscriber.

37. Apparatus according to any of claims 26 to 36 wherein the apparatus is adapted to notify the subscriber of a selected number of e-mails.

38. Apparatus according to any of claims 26 to 37 wherein the apparatus is adapted to notify a subscriber of each e-mail received by the mail centre.

39. Apparatus according to any of claims 26 to 37 wherein the apparatus is adapted to notify a subscriber only of the first e-mail received by the mail centre since the subscriber last accessed the mail centre.

40. Apparatus according to any of claims 26 to 39 wherein the broadcast signal is a digital data stream.

41. Apparatus according to claim 40 further comprising means for compressing the digital data stream using a digital compression technique.

42. Apparatus according to claim 40 or 41 wherein the apparatus is adapted to send the notification message as a section of the digital data stream.

43. Apparatus according to claim 40 or 41 wherein the apparatus is adapted to send the notification message by way of an entitlement management message.

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44. Apparatus according to any of claims 26 to 43 wherein the broadcast signal comprises a television signal.

45. Apparatus according to any of claims 26 to 44 wherein the apparatus is adapted to push the notification message to the subscriber.

46. Apparatus for notifying a subscriber of the receipt of e-mail by a mail centre, which e-mail is to be transmitted to the subscriber via a first medium, comprising means for transmitting a notification message, indicating the receipt of e-mail by the mail centre, to the subscriber via a second medium, different from the first medium.

47. Apparatus according to claim 46 wherein the first medium is a switched medium and the second medium is a broadcast medium.

48. A receiver/decoder for receiving and/or decoding a broadcast signal, comprising means for receiving, together with a broadcast signal, a notification message for notifying a subscriber of the receipt of e-mail by a mail centre.

49. A receiver/decoder according to claim 48 wherein the receiver/decoder is adapted to compare an identifier in the notification message with an identifier which is stored at the receiver/decoder.

50. A receiver/decoder according to claim 48 or 49 wherein the receiver/decoder has a smartcard number and the identifier comprises at least part of the smartcard number.

51. A receiver/decoder according to any of claims 48 to 50 wherein the receiver/decoder generates a signal indicating the receipt of e-mail by the mail centre.

52. A receiver/decoder according to any of claims 48 to 51 wherein the receiver/decoder generates a signal for displaying at least part of the notification message.

53. A receiver/decoder for receiving and/or decoding a broadcast signal, comprising means for receiving e-mail via a first medium and means for receiving a

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notification message, indicating the receipt of e-mail by the mail centre, via a second medium different from the first medium.

54. A receiver/decoder according to claim 53 wherein the first medium is a
5 switched medium and the second medium is a broadcast medium.

55. System for notifying a subscriber of the receipt of e-mail comprising
apparatus according to any of claims 26 to 47 and a receiver/decoder according to any of
claims 48 to 54.

10

56. An internet account management system for use with a broadcast system.

57. An internet account management system according to claim 56 comprising
means, such preferably as a store, for storing information relating to e-mail accounts.

15

58. An internet account management system according to claim 56 or 57
wherein information relating to e-mail accounts is linked to identifiers of
receiver/decoders.

20 59. An internet account management system according to claim 58 wherein the
information relating to e-mail accounts is linked to the smartcard numbers of
receiver/decoders.

25 60. A broadcast system including an internet account management system
according to any of claims 56 to 59.

61. A broadcast system according to claim 60, including a Subscriber
Authorisation System which is at a separate location from the internet account
management system.

30

62. A broadcast system according to claim 60 or 61, including a Subscriber
Management System.

63. A broadcast system according to claim 62, wherein the Subscriber

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Management System is at the same location as the internet account management system.

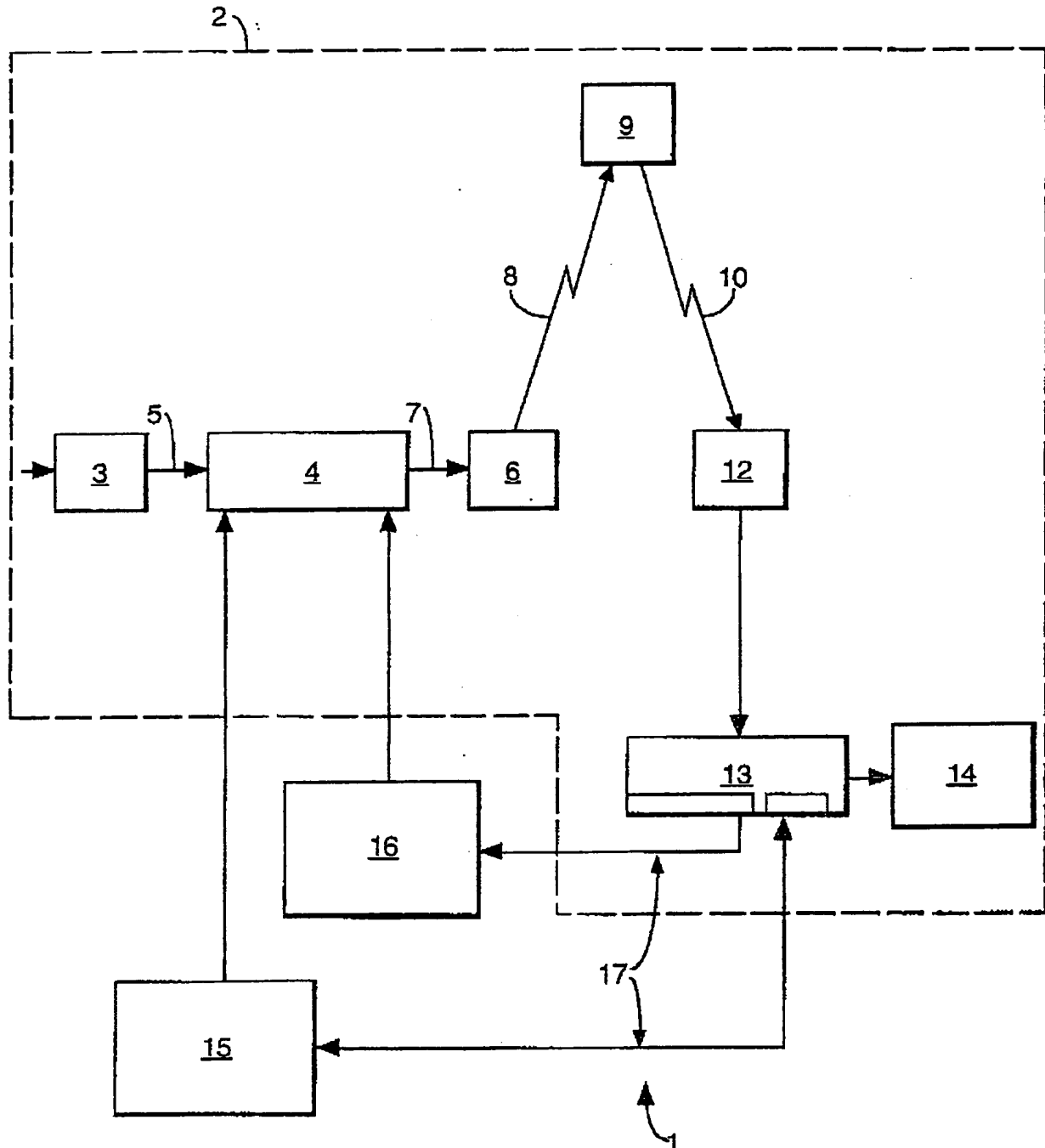
64. A broadcast system according to claim 62 or 63 as dependent on claim 61, wherein the internet account management system is coupled to the Subscriber Management System but not to the Subscriber Authorisation System.

65. A broadcast system according to claim 62, 63 or 64, further comprising an Internet Service Provider, wherein the Subscriber Management System is adapted to store subscriber information including subscriber smartcard numbers, and the subscriber smartcard numbers are not passed to the Internet Service Provider.

66. A broadcast system comprising a Subscriber Management System for storing subscriber information including subscriber smartcard numbers, and an Internet Service Provider, wherein the subscriber smartcard numbers are not passed to the Internet Service Provider.

$\frac{1}{6}$

Fig.1.



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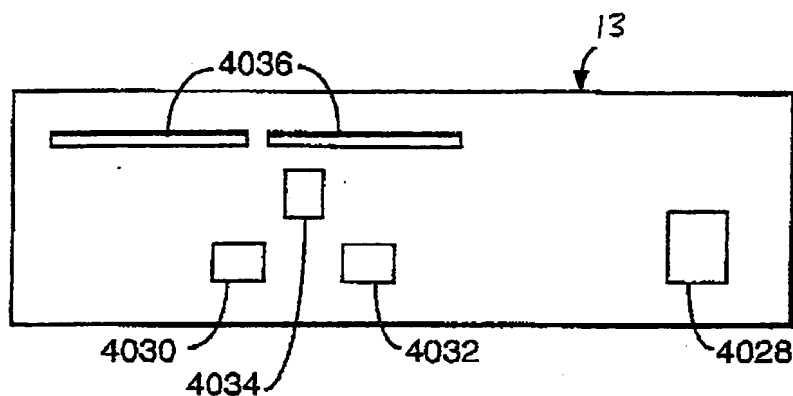


Fig. 2

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Fig. 3

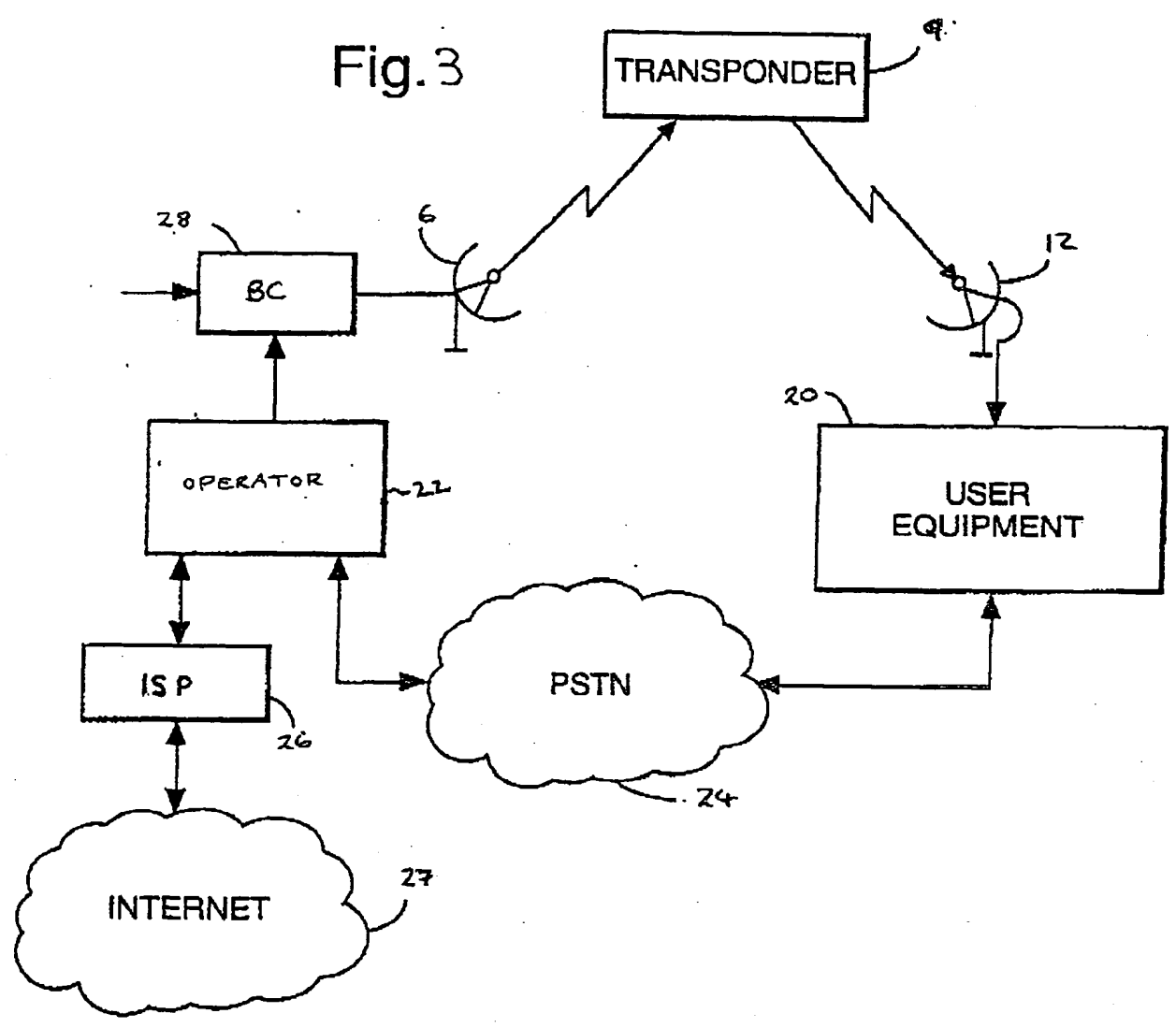
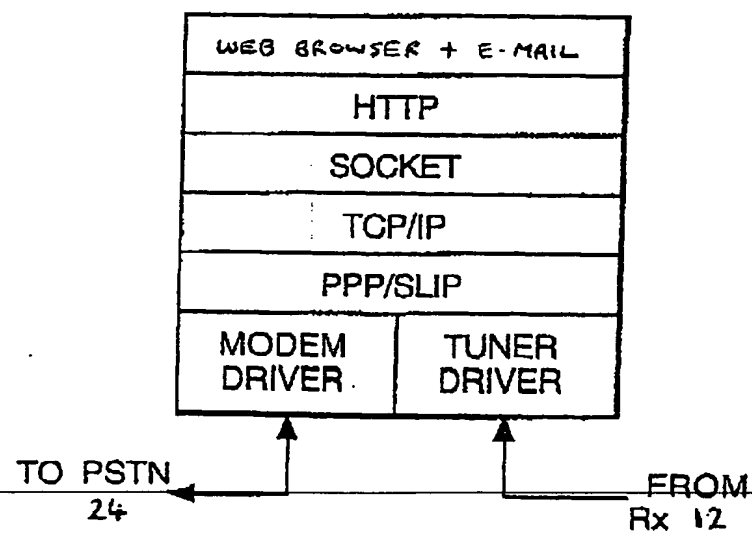


Fig. 4



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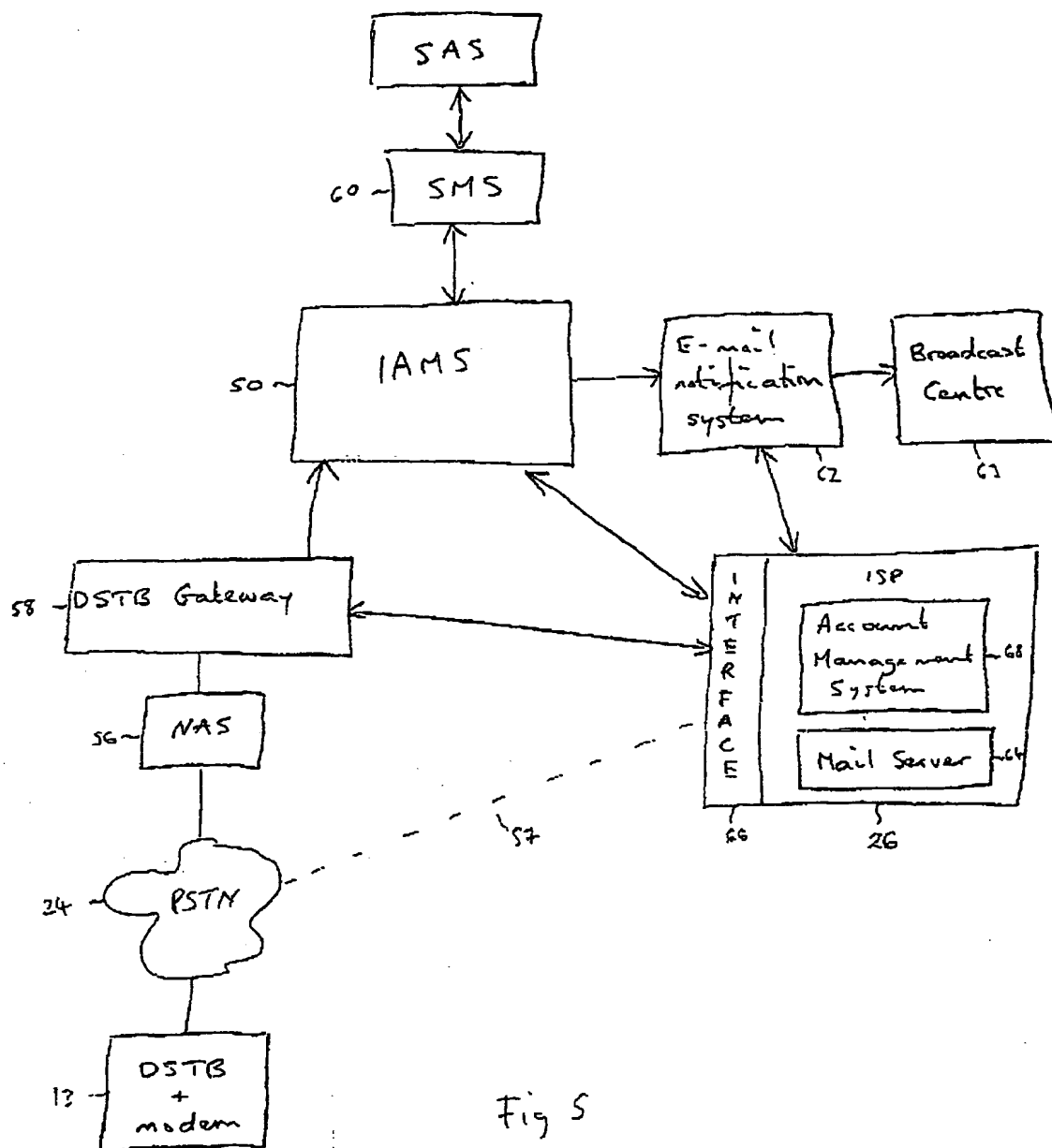


Fig 5

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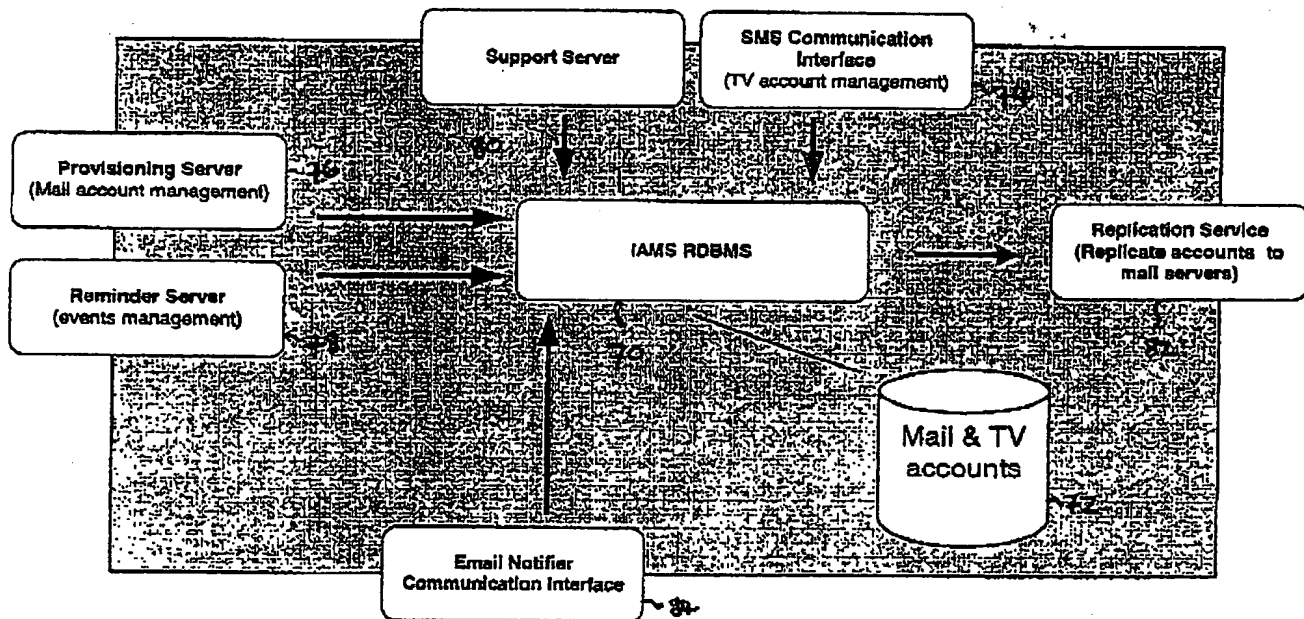


Fig. 6

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Fig. 7

